**To:** Ayn Schmit/EPR/R8/USEPA/US@EPA;CN=Gregory Oberley/OU=EPR/OU=R8/O=USEPA/C=US;CN=Nathan Wiser/OU=R8/O=USEPA/C=US@EPA;CN=Mike Wireman/OU=R8/O=USEPA/C=US@EPA;CN=Darcy Campbell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Gregory Oberley/OU=EPR/OU=R8/O=USEPA/C=US;CN=Carol Russell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Tricia Pfeiffer/OU=R8/O=USEPA/C=US@EPA;Nat Miullo/RA/R8/USEPA/US@EPA;CN=Kate Fay/OU=R8/O=USEPA/C=US@EPA[]; N=Gregory Oberley/OU=EPR/OU=R8/O=USEPA/C=US;CN=Nathan Wiser/OU=R8/O=USEPA/C=US@EPA;CN=Mike Wireman/OU=R8/O=USEPA/C=US@EPA;CN=Darcy Campbell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Gregory Oberley/OU=EPR/OU=R8/O=USEPA/C=US;CN=Carol Russell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Tricia Pfeiffer/OU=R8/O=USEPA/C=US@EPA;Nat Miullo/RA/R8/USEPA/US@EPA;CN=Kate Fay/OU=R8/O=USEPA/C=US@EPA[]; N=Nathan Wiser/OU=R8/O=USEPA/C=US@EPA;CN=Mike Wireman/OU=R8/O=USEPA/C=US@EPA;CN=Darcy Campbell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Gregory Oberley/OU=EPR/OU=R8/O=USEPA/C=US;CN=Carol Russell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Tricia Pfeiffer/OU=R8/O=USEPA/C=US@EPA;Nat Miullo/RA/R8/USEPA/US@EPA;CN=Kate Fay/OU=R8/O=USEPA/C=US@EPA[]; N=Mike Wireman/OU=R8/O=USEPA/C=US@EPA;CN=Darcy Campbell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Gregory Oberley/OU=EPR/OU=R8/O=USEPA/C=US;CN=Carol Russell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Tricia Pfeiffer/OU=R8/O=USEPA/C=US@EPA;Nat Miullo/RA/R8/USEPA/US@EPA;CN=Kate Fay/OU=R8/O=USEPA/C=US@EPA[]; N=Darcy Campbell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Gregory Oberley/OU=EPR/OU=R8/O=USEPA/C=US;CN=Carol Russell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Tricia Pfeiffer/OU=R8/O=USEPA/C=US@EPA;Nat Miullo/RA/R8/USEPA/US@EPA;CN=Kate Fay/OU=R8/O=USEPA/C=US@EPA[]; N=Gregory Oberley/OU=EPR/OU=R8/O=USEPA/C=US;CN=Carol Russell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Tricia Pfeiffer/OU=R8/O=USEPA/C=US@EPA;Nat Miullo/RA/R8/USEPA/US@EPA;CN=Kate Fay/OU=R8/O=USEPA/C=US@EPA[]; N=Carol Russell/OU=EPR/OU=R8/O=USEPA/C=US@EPA;CN=Tricia Pfeiffer/OU=R8/O=USEPA/C=US@EPA;Nat Miullo/RA/R8/USEPA/US@EPA;CN=Kate Fay/OU=R8/O=USEPA/C=US@EPA[]; N=Tricia Pfeiffer/OU=R8/O=USEPA/C=US@EPA;Nat Miullo/RA/R8/USEPA/US@EPA;CN=Kate Fay/OU=R8/O=USEPA/C=US@EPA[]; at Miullo/RA/R8/USEPA/US@EPA;CN=Kate Fay/OU=R8/O=USEPA/C=US@EPA[]; N=Kate Fay/OU=R8/O=USEPA/C=US@EPA[]
**Cc:** []
**From:** CN=Marcella Hutchinson/OU=R8/O=USEPA/C=US
**Sent:** Wed 7/11/2012 10:39:10 PM
**Subject:** Fw: [WQ News] More on Old Geology, Environmental Risk and the Gas Rush

Dot Earth - New York Times blog
ANDREW C. REVKIN
Abrahm Lustgarten
has spent years exposing problems
gas
oil
post on a new study of pathways between deep gas-bearing rock and near-surface aquifers
Your Dot
New York SGEIS
my series about injection disposal
Ohio

Florida
In my reporting on injection wells
Haverhill, Ohio
Osborn 2011

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FYI

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Change is the only constant.
- Heraclitus

----- Forwarded by Marcella Hutchinson/R8/USEPA/US on 07/11/2012 04:38 PM -----

From: Loretta Lohman <lorettalohman@gmail.com>
To: wq-news@googlegroups.com
Date: 07/11/2012 03:54 PM
Subject: [WQ News] More on Old Geology, Environmental Risk and the Gas Rush
Sent by: wq-news@googlegroups.com

July 11, 2012, 10:00 am
More on Old Geology, Environmental Risk and the Gas Rush
By ANDREW C. REVKIN
Abrahm Lustgarten, the ProPublica reporter who has spent years exposing problems that have accompanied the country's gas and oil quests, sent a reaction to yesterday's post on a new study of pathways between deep gas-bearing rock and near-surface aquifers that prompted me to adjust one line. But his full comment, and a resulting exchange, are worth posting here as a "Your Dot" contribution.
The paper found no correlation between the locations of near-surface water samples showing traces of deep-rock brine and gas wells. I initially reacted this way: "The study should end concerns that reports of briny water mixing with drinking water have anything to do with gas drilling...."
Here's Lustgarten:
Saying that the study "should end concerns " [updated to "ease concerns" following my chat with him] sounds more resolved than I see it, and I would tend to wait and watch as the scientific investigation continues. We're just seeing the first 3-4 studies of this issue ever, and there are more to come. Besides, my impression was that this study was narrowly focused on the test of whether natural pathways exist, examined through an attempt to match brines found in water with brines believed to have come from deep below. I am not aware that the researchers analyzed the water for drilling contaminants, in the way, for example, that the EPA is investigating alleged contamination in Wyoming or did in Dimock, Pa., or that they even sought to answer that question.
That said, it certainly is significant that no correlation between the brine mixing and the drilling activity was

established, and you are right that in the short term this may ease some concerns.
That said, it's actually not the findings/lack thereof about chemical fracking pollutants that I find most interesting about this article, though undeniably the current controversy and headline climate makes it difficult not to orient the discussion around that.
If we can put aside the fracking and chemical rhetoric for moment, I think this research is more revelatory for what it tells us about the geological properties themselves.
What strikes me as most significant is not only the establishing of probable pathways, but Engelder and others' reaction to that finding. In years of reporting on this issue - and the waste injection well issue, which really concerns the same questions about pathways - the public explanation has consistently been that no underground migration at all is possible. We've been told we know this because of logic (there is so much separation there is simply no way ) and because of geology (the Marcellus and other layers are so impermeable no fluids can get through them, or there are no fractures or faults to allow movement). This is what the oil and gas industry trade groups say in public, it's what the regulators say (the New York SGEIS, for example), and so on.
In the scientific community geologists are less universally confident, but the consensus conventional wisdom is still largely the same: This can't happen. It's virtually impossible.
And yet the National Academy of Sciences article published yesterday says that it is happening. (And in the first articles in my series about injection disposal wells I cited several other cases in Ohio and Florida where it happened through natural pathways). When yesterday's research came out, I expected the gas industry, for example, to struggle to address the idea that pathways exist, but instead they tell me they have long known that underground migration happens. The question, they now ask, is how long does it take? Engelder says the same - that even though the public has generally been led to believe upward migration is impossible, he has long known that it happens in some places. Well since when? And why haven't these same people discussed the potential of natural pathway migration before?
And so the conversation is steered towards the next (and still very important) question of timescale, instead of focusing for a moment longer on the very significant fact that the safety of a 150,000-well deep disposal program and all the other hundreds of thousands of wells drilled in this country is based on the premise that migration cannot happen.
Lets pause on that for a moment. The federal government runs a national regulatory program to oversee the underground injection of waste. The fundamental premise of the regulations is A) that drinking water is highly vulnerable to such injections and B) that the practice of injection can be made safe by rigorously regulating the well construction itself. For most injection wells regulations only address the well structure and site because it is assumed that the natural geological layering makes vertical migration impossible. (Fracking is an identical process to waste injection, but isn't regulated under the same program because of exemptions). In my reporting on injection wells, I learned that the scientific view is shifting and the certainty is waning. Yesterday's research article adds to the evidence that this premise may be seriously flawed.
I see the science on these issues as evolving incrementally. No one article will resolve the issue. The time question is essential, and I hear there are teams out there researching it now, including one from the Department of Energy. If we can know it generally takes 200 million years for this to happen, as Engelder says, then we probably don't care much about the risk. If we find that it takes 100 years, we might reconsider. If its 10, we've got a present-moment issue to face. Only additional research will answer these questions. But there is information out there. One case study that I examined in Haverhill, Ohio, concerned the injection of hazardous waste that was detected in a rock layer 1,400 feet above where it was intended to go. In this case scientists found that there were no problems with the injection well cement or casing - the waste had leaked through natural pathways. Most interesting to me is their estimates that it took about 20 years for the waste in Ohio to move as far as it had, and that it could still be slowly making its way upward. This is a slow enough timescale that the risk can seem remote, but fast enough that someone we know in our lifetime is likely to deal with the consequences.
I sent a couple of followup queries, consolidated here:
- Didn't the previous paper from the Duke group (Osborn 2011) rule out drilling contaminants?
- Isn't the injection well issue separate from this particular discussion? (This about extraction, with the only injection in the gas production process is the fracking itself.)
His reply:
Yes, you are right. So amend what I wrote. But what I was getting at (and it doesn't diminish the importance of these example where chemicals are NOT found) is that they weren't investigating known contamination to determine where it came from. Also, I'm not clear whether these were the same water samples, had some overlap, or were entirely different. Anyway, it is good to determine that this water isn't polluted by fracking. But some water is polluted - like in Dimock, or in Pavillion -- and in those cases the question is what caused it? That's what I mean is a different approach.
As to whether injection wells are irrelevant - clearly they weren't the focus (or even in the minds of) Jackson and the other researchers on this paper, so I'm not saying that the paper is explicitly about injection wells. And maybe it is a news-stretch. But it happens to my current frame of mind because I've been thinking a lot about it, and the key issues overlap. So I guess I'm finding the relevance, or pointing out. It would be hard to argue that one doesn't matter to the other. And I find useful reference in the injection well issue because A) there is a regulatory paradigm set up to deal with it and B) the case studies are there. Its nice to know that there are no frack chemicals in the water wells tested in eastern Pennsylvania two to four years after the area was drilled. But if case studies show it has taken decades for migration to happen in some places, it at least raises the possibility that it would be too soon to tell about the impact of fracking or other injection from drilling. Of course the geology and environment is different in every single place we talk about, so we're dealing in broad lessons and generalizations here. I'm not arguing that the

story will turn out badly. I'm arguing that we can't say it will turn out fine and that the things that have been said to argue it is fine are sometimes turning out to be wrong.


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